LUIS MATEUS ROCHA

Modeling, Algorithms, and Informatics Group (CCS-3)
MS B256, Los Alamos National Laboratory
Los Alamos, NM 87545
T: (505) 665-5328 • Fax: (505) 667-1126

e-mail: rocha@lanl.gov or *rocha@santafe.edu*
www: http://www.c3.lanl.gov/~rocha/
Full Curriculum Vitae available at
http://www.c3.lanl.gov/~rocha/cv.html.

Professional Appointments:

LOS ALAMOS NATIONAL LABORATORY, MODELING, ALGORITHMS, AND INFORMATICS GROUP, Member of the Technical Staff since 01/99, Postdoctoral Associate, 1997-1999. Leader of the *Complex Systems Modeling Research Focus Area*.

INSTITUTO GULBENKIAN DA CIENCIA, Lisbon, Portugal. Leader of the Mathematical and Computational Biology Collaboratorium and Visiting Professor, 04/00-present.

STATE UNIVERSITY OF NEW YORK AT BINGHAMTON, DEPARTMENT OF SYSTEMS SCIENCE AND INDUSTRIAL ENGINEERING, Adjunct Professor, 1995-1997 and Information Systems Manager, 1995-1997

LABORATÓRIO NACIONAL DE ENGENHARIA CIVIL (NATIONAL LABORATORY FOR CIVIL ENGINEERING), LISBON, PORTUGAL, Research Assistant in 1990, Graduate Researcher from January 1991 to November 1991.

Research Interests:

Complex Systems: Computational Biology, Bioinformatics, Adaptive Computation, Evolutionary Systems, Genetic Algorithms, Artificial Life, Cellular Automata, Social Networks, Agent-based Modeling, RNA Editing.

Distributed Information Systems: Intelligent Information Retrieval, Adaptive Webs, Collective Knowledge Organization, Recommendation Systems, Structural and Semantic Analysis of Networks, Knowledge Management, Data-Mining, Knowledge Discovery, Internet Development, Models of Cognitive Categorization.

Fuzzy Logic and Uncertainty Modeling: Evidence Theory, Measures of Uncertainty, Interval Computation.

Academic Education:

PhD in Systems Science, 1997, State University of New York, Binghamton, New York.

Bachelor's in Mechanical Engineering (1985-1988) and Masters in Systems Engineering (1988-1990), Instituto Superior Técnico, Lisbon, Portugal.

Professional Service:

Editorial Board: *Journal of Applied Systems Studies*

Ad Hoc Editor: *Artificial Life, Biosystems, Communication and Cognition - Artificial Intelligence*

Ad Hoc Reviewer: *Adaptive Behavior, Advances in Complex Systems, Artificial Life, Behavioral and Brain Sciences, Biosystems, Complex Systems, IEEE Transactions on Evolutionary Computation, IEEE Transaction on Systems Man and Cybernetics, International Journal of Human-Computer Studies, International Journal of General Systems, International Journal of Operations Research, Proceedings of the National Academy of Sciences* (PNAS), *Systems Research*.

Selected Conference Program Committees and Organization

2003 Congress on Evolutionary Computation (CEC), Canberra, Australia, December 2003
IEEE Integration of Knowledge Intensive Multi-Agent Systems, Cambridge, MA., 1-3 October 2003.
Oeiras Mathematical and Computational Biology Workshop, Oeiras, Portugal, June 20th 2003.
International seminar on new robotics, evolution and embodied cognition, Lisbon, November 12-15 2002.
From Intelligent Networks to the Global Brain: Evolutionary Social Organization through Knowledge Technology, Brussels, July 3-5, 2001.
Congress on Evolutionary Computation (CEC) part of the IEEE World Congress on Computational Intelligence, Hawaii, 2002.
Complex Systems 2000, Dunedin, New Zealand, November 2000.

Review Panels

UMCEES Review Panel, National Research Council, 2001
Computer Science and Robotics Review Panel of the Fundacao Ciencia e Tecnologia, Portugal 2000, 2003
Computer Science and Software Engineering internal proposal (LDRD) review committee at the Los Alamos National Laboratory 1998-2000.

Selected Recent Invited Lectures

GENETIC REGULATORY NETWORKS: THEORY AND PRACTICE, Canberra, Australia, 8th - 12th December 2003
Co-Chair

CENTER FOR COMPLEX SYSTEMS, UNIVERSITY OF MICHIGAN, ANN ARBOR, December 5, 2002
Invited Speaker

CRITICAL STUDIES WORKSHOP, STANFORD UNIVERSITY, MAY 8, 2002.
Invited speaker.

GORDON RESEARCH CONFERENCE ON RNA EDITING JANUARY 21-26, 2001, VENTURA, CA.
Invited keynote session speaker: "Simulations of RNA Editing and the Origin of Codes".

WORKSHOP OF THE SYSTEMS THEORY OF BIO-INFORMATICS AND ITS EXTENSION TOWARDS ENGINEERING DESIGN THEORY PROJECT, GRADUATE SCHOOL OF ENGINEERING, KYOTO UNIVERSITY, KYOTO, JAPAN, NOVEMBER 2001.
Invited Speaker

SANTA FE INSTITUTE WORKSHOP DESIGN PRINCIPLES FOR THE IMMUNE SYSTEM AND OTHER DISTRIBUTED AUTONOMOUS SYSTEMS, JULY 11-16, 1999, SANTA FE, NM.
Invited Speaker: "Biologically Motivated Distributed Designs for Adaptive Knowledge Management".

Selected List of Recent Publications:

Almeida e Costa, F., Luis M. Rocha ,and M. Bedau (Eds.) [2003]. *Evolutionary Systems, Embodiment and New Robotics*. *Artificial Life*. In Preparation.

Huang, Chien-feng and Luis M. Rocha [2003]. "Using genetic algorithms to explore RNA Editing". *Biosystems*. Submitted.

Joslyn, Cliff and Luis M. Rocha [1998] "Towards a Formal Taxonomy of Hybrid Uncertainty Representations". *Information Sciences*. Vol. 110, pp. 255-277.

Rocha, Luis M. And W. Hordijk [2003]. "The emergence of symbols and representations". *Artificial Life*. Submitted.

Rocha, L. M., L. Adamic, A. Rechtsteiner, and M. Wall. [2003]. "Mining the 'Bibliome': Automatic Literature Analysis for Bioinformatics". *Bioinformatics using Computational Intelligence Paradigms*. U. Seiffert(Ed.). World Scientific Press. In Press.

Rocha, Luis M. and Johan Bollen [2001]. Biologically motivated distributed designs for adaptive knowledge management". In: *Design Principles for the Immune System and other Distributed Autonomous Systems*. L. Segel and I. Cohen (Eds.) Santa Fe Institute Series in the Sciences of Complexity. Oxford University Press, pp. 305-334.

Rocha, Luis M. (Ed.)[2001]. *The Physics and Evolution of Symbols and Codes*. *Biosystems* Vol. 60, No. 1-3. Editorial: *Biosystems* Vol. 60, pp. 1-4.

Rocha, Luis M. [2001]. "Evolution with material symbol systems". *Biosystems*. Vol. 60, pp. 95-121.

Rocha, Luis M. [2002]. "Semi-metric Behavior in Document Networks and its Application to Recommendation Systems". In: *Soft Computing Agents: A New Perspective for Dynamic Information Systems*. V. Loia (Ed.) International Series Frontiers in Artificial Intelligence and Applications. IOS Press, pp. 137-163.

Rocha, Luis M. [2000]. "Syntactic autonomy, cellular automata, and RNA editing: or why self-organization needs symbols to evolve and how it might evolve them". *Annals of the New York Academy of Sciences*. Vol. 901, pp 207-223.

Rocha, Luis M. [1999]."Evidence Sets: Modeling Subjective Categories." *International Journal of General Systems*. Vol. 27, pp. 457-494.

Rocha, Luis M. [1996]. "Eigenbehavior and symbols." *Systems Research* Vol. 13, No 3, pp. 371-384.

Rocha, Luis M., V. Kreinovich, and R. Kearfott [1996]."Computing Uncertainty in Interval Based Sets." In: *Applications of Interval Computation*. R.B. Kearfott and V. Kreinovich (Eds.). Kluwer Academic Publishers. pp.337-380.

Rocha, Luis M. [1995]."Contextual Genetic Algorithms: Evolving Developmental Rules." In: *Advances in Artificial Life*. F. Moran, A. Moreno, J.J. Merelo, and P. Chacon (Eds.). Lecture Notes in Artificial Intelligence, Springer-Verlag. pp. 368-382.

Wall, Michael E., Andreas Rechtesteiner, and Luis M. Rocha [2003]. "Singular Value Decomposition and Principal Component Analysis ". In: *Understanding And Using Microarray Analysis Techniques: A Practical Guide*. D. P. Berrar, W. Dubitzky, and M. Granzow (Eds.). Kluwer Academic Publishers, pp. 91-109.